Chapter 7
Plants and Animals

This chapter discusses the potential impacts of the Proposal and each alternative on plants and animals. Methodology and analysis are discussed in more detail in Appendix F.

7.1 Existing Conditions

7.1.1 Wildlife Habitat

Habitat within the study area (see Figure 2-2) is commercial conifer forests composed primarily of Douglas fir (*Pseudotsuga menziesii*) in various age classes ranging from recent clearcuts to early mature forest. These second or third generation forests also include western red cedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), and grand fir (*Abies grandis*). The habitat is basically two-layered, consisting of a tree canopy and an understory with a low shrub layer. Dominant understory plants include sword fern *(Polystichum munitum*), salal (*Gaultheria shallon*), Oregon grape (*Mahonia nervosa*), lady fern (*Athyrium filix-femina*), deer fern (*Blechnum spicant*), red huckleberry (*Vaccinium parvifolium*), trailing blackberry (*Rubus ursinus*), salmonberry (*Rubus spectabilis*), and vine maple (*Acer circinatum*).

For the purposes of impact analysis for this EIS process, the conifer forest was mapped (Figures 7-1A and 7-1D) in the following cover types: seedling/shrub, sapling, pole, early mature, and mature. A description of each of these cover types is listed below.

- **Seedling/shrub.** Seedling/shrub stands are recently clearcut areas that have been replanted with Douglas fir seedlings. Seedlings are less than 1 inch in diameter and less than 5 feet tall. Grasses, ferns, and various forbs and shrubs are also present. Many of these species were present in the prior forest and persist in the clearcut, such as evergreen blackberry (*Rubus laciniatus*), fireweed (*Epilobium angustifolium*), and sword fern. Other species, like Himalayan blackberry (*Rubus discolor*) and Scot's broom (*Cytisus scoparius*) are invasive weeds.
- **Sapling.** Saplings are trees between 1 inch and 4 inches in diameter. Saplings do not form a continuous canopy. The Douglas fir are crowding out other species. During this stage, stands are often treated with herbicides to remove competing deciduous trees and shrubs.
- **Pole Forest.** Pole size trees are between 4 inches and 10 inches in diameter. A continuous canopy has formed and little understory persists. Dead branches are present under the growing canopy, and there is little open space under the canopy. These forests have the

lowest species and habitat diversity and host the fewest wildlife species.

- **Early Mature Forest.** An early mature forest has trees greater than 10 inches in diameter. They continue to have a closed canopy with a single canopy layer. Generally, these forests do not have openings, downed woody debris, snags, and other features of old-growth forests. An understory shrub layer is beginning to develop.
- **Mature and Old-Growth Forest.** Mature forests are characterized by trees greater than 24 inches in diameter, a multi-layered canopy, a rich understory of shrubs, gaps in the canopy, snags, and downed woody debris. Only a small patch of mature forest is found on the south bluff in the southwestern corner of the Upper Site.

Figures 7-1a through 7-1d, which show the existing vegetation within the Upper and Lower Sites, were prepared to characterize and quantify habitat types in the proposed project areas. The seven different stages of vegetation described above were identified from unrectified color photographs (Janikowski Oost & Associates, March 7, 2000) and were further confirmed by field investigation. Figures 7-2a and 7-2b show these different vegetation stages described above. Approximate acreages of each cover type are listed in Table 7-1. Acreages listed are rough calculations and meant to show proportional cover types and not exact amounts.

Table 7-1
Existing Vegetation Cover-Type Areas (acres)

	Lower Site	Upper Site	Total
Clearcut	0.0	0.0	0.0
Seedling/shrub	2.0	134.0	136.0
Sapling	98.0	236.0	334.0
Early Mature	0.0	0.0	0.0
Pole	0.0	185.0	185.0
Mature	0.0	23.0	23.0
Unvegetated Mine/Bare	15.0	0.0	15.0
Open Water	0.0	0.0	0.0
Total	**115.0**	**578.0**	**693.0**

Several other cover types are also present in small pockets either within the study area, along the Grouse Ridge Road, or adjacent to the proposed project area.

- **Mixed Forest.** Mixed forest tree species include big leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), black *cottonwood (Populus trichocarpa*), western red cedar, western hemlock, Douglas fir, bitter cherry (*Prunus emarginata*), and Pacific dogwood (*Cornus nuttallii*). The understory of the mixed forest includes such species as vine maple, Indian plum (*Oemeleria cerasiformis*), devil's club (*Oplopanax horridus*), red elderberry (*Sambucus racemosa*), trailing blackberry, salmonberry,

and sword fern. The mixed forest community is successionally transitional, with the climax plant community being western hemlock/sword fern. Mixed forest is attractive to wintering wildlife that uses coniferous vegetative cover as shelter from snow and storms.

- **Red Alder Forest.** Red alder forests commonly develop following site disturbance and are frequently associated with floodplains and wetlands. This forest type is primarily located outside of the proposed excavation and processing facility areas. Red alder forests also are found in several of the gullies adjacent to the study area and in pockets along SE Grouse Ridge Road. Commercial forest management eliminates this cover type on managed lands.
- **Riparian.** This habitat consists of vegetated areas adjacent to streams located in the study area and along the SE Grouse Ridge Road/Fire Training Center Service Road. Riparian areas associated with streams fed by onsite aquifers are located adjacent to the north and south sides of the Upper Site. These areas support a diverse array of shrubs and immature trees including immature Pacific willow (*Salix lucida* spp. *lasiandra*), immature red alder, immature western hemlock, red elderberry, Himalayan blackberry, and youth-on-age (*Tolmiea menziesii*).

7.1.2 Streams and Aquatic Habitat

Listed below are streams found within the immediate vicinity or in the study area:

- One stream and one seep located in the northeast corner of the Lower Site. These are about 80 feet apart run approximately parallel to each other, flowing in a southwesterly direction. Both are ephemeral and infiltrate into the ground entirely before reaching a downstream waterbody. The area immediately downslope of the stream and seep is a moist deciduous forest dominated by red alder. Immediately south of the red alder forest is a wetland.
- A few small tributary streams flowing north and south outside the Upper Site. For most of their length, these streams exceed 8 percent gradient. The lower reaches of the north-flowing streams enter a bowl-shaped basin before joining into a single stream that empties into the Middle Fork of the Snoqualmie River (Figure 7-3). Stream gradients in this basin are less than 6 percent.
- Streams crossed by SE Grouse Ridge Road, including the South Fork of the Snoqualmie River, which is inventoried as a "shoreline of the state." SE Grouse Ridge Road crosses 14 streams as shown in Figure 7-4. Table 7-2 lists 17 streams that are in the vicinity of SE Grouse Ridge Road, but three of the streams (9a, 10a, and 10b) are not crossed by the road. These three are smaller tributaries that enter larger tributary streams upstream of the road crossing. Streams 9a and 10a enter roadside ditches and flow 50 to 100 feet before flowing into streams 9 and 10. Stream 10b flows into Wetland C about 70 to 80 feet from the road and would not be affected by road widening.

Also, streams 1 and 12 would not be affected by road widening. Therefore of the 17 streams in the vicinity, there are 14 existing crossings (three streams are tributaries upstream of the road crossings). Road widening may occur at 12 of the crossings, impacting the channels of the 12 streams crossed. In addition, if road widening occurs on the upstream side of the road at the crossings of streams 9 and 10, the portions of streams 9a and 10a (two streams) that flow through roadside ditches would be impacted. No impacts to the channels of the streams 1, 10b, and 12 (three streams) would occur due to road widening. The crossings of streams 1 and 2 have gradients of less than 2 percent while the other tributary streams have gradients of 6 to 15 percent.

Table 7-2
Stream Crossings on SE Grouse Ridge Road

Waterway		Location			Characteristics		
Stream Name	Mapped Stream No.	Section, Township, and Range	Latitude	Longitude	Fish Present at Crossing[a]	WDNR Stream Type[b]	Road Crosses Stream
1. S.F. Snoqualmie River	1	352309	47º25'58"	121º37'50"	Yes	1	Yes
2. Unnamed Creek	2	342309	47º26'08"	121º38'02"	Yes	3[c,e]	Yes
3. Unnamed Creek	3	342309	47º26'12"	121º37'59"	Yes	3[c,d]	Yes
4. Unnamed Creek	4	342309	47º26'16"	121º38'00"	No	5[c,d]	Yes
5. Unnamed Creek	5	342309	47º26'19"	121º38'08"	Yes	3[c,e]	Yes
6. Unnamed Creek	6	342309	47º26'21"	121º38'11"	No	5[c,e]	Yes
7. Unnamed Creek	7	272309	47º26'26"	121º38'18"	Yes	3[c,e]	Yes
8. Unnamed Creek	8	272309	47º26'27"	121º38'26"	No	5[c,e]	Yes
9. Unnamed Creek	9	272309	47º26'30"	121º38'34"	No	5[c,d,f]	Yes
10. Unnamed Creek	9a	272309	47º26'31"	121º38'35"	No	5[c,g,i]	No
11. Unnamed Creek	10	272309	47º26'39"	121º38'41"	Yes	3[c,d,h]	Yes
12. Unnamed Creek	10a	272309	47º26'41"	121º38'42"	No	5[c,g,i]	No
13. Unnamed Creek	10b	272309	47º26'38"	121º38'39"	No	4[c,i]	No
14. Unnamed Creek	11	272309	47º26'44"	121º38'53"	Yes	3[c,e]	Yes
15. Unnamed Creek	11a	272309	47º26'45"	121º38'57"	No	5[c,d,f]	Yes
16. Unnamed Creek	12	272309	47º26'51"	121º38'59"	No	5[d]	Yes
17. Unnamed Creek	13	282309	47º27'09"	121º39'12"	No	4[c,d]	Yes

[a] All stream reaches of perennial streams accessible to fish contain populations of shorthead sculpin (*Cottus confusus*), rainbow trout (*Oncorhynchus mykiss*), coastal cutthroat trout (*Oncorhynchus clarki clarki*), and rainbow/cutthroat trout hybrids.

[b] With the exception of the South Fork of the Snoqualmie River, which is inventoried as a "shoreline of the state" under the Shoreline Management Act, all stream classifications were made by the surveyor and are not designations taken from WDNR stream type maps.

[c] Possible instream work (extension of culverts if road widening is required) on one side of road

[d] Impassable culvert

[e] Partial blockage at culvert

[f] Heavily scoured stream channel is dry except during rain-on-snow events.

[g] Roadside ditch fed by short swale above steep embankment.

[h] Fish are not present above impassable road culvert

[i] Tributary that enters main stream immediately upstream of road crossing

Streams 2 and 5 through 9 (noted on Table 7-2) and those flowing south from the Upper Site all have intact riparian areas of mature second-

growth mixed conifer forest dominated by western hemlock and red alder. The South Fork of the Snoqualmie River (stream 1) flows through second growth mixed conifer/deciduous forest at the SE Grouse Ridge Road bridge site. The second growth forest is dominated by red alder, with some bigleaf maple, Douglas fir, red cedar, sitka spruce (*Picea sitchensis*), and western hemlock present. Vine maple, Indian plum, red elderberry, devil's club, and Pacific dogwood are common understory shrubs along with sword fern, salal, lady fern, deer fern, Oregon grape, red huckleberry, trailing blackberry, and salmonberry. Streams 3 and 4 flow over a grassy slope for approximately 200 feet below the road. Extensive clearcuts exist just outside the narrow riparian buffers of streams 10 through 13, with the clearcuts often extending inside the buffers to the stream banks. Streams on the north side of Grouse Ridge plateau flow through clearcuts or residential areas. Most of their riparian areas are in early seral stages (early stages of plant community succession), except for a narrow strip along the uphill side of Lake Dorothy Road where mature second-growth mixed forest dominates. Red alder, with some black cottonwood, is the dominant tree in the early successional forest.

The stream bottoms are primarily composed of gravel and cobble, with some sand and silt in lower gradient (less than 6 percent) reaches running through clearcut areas. This habitat is used by water-dependent amphibian, fish, bird, and mammal species.

7.1.3 Wetlands

A wetlands investigation and delineation for this EIS confirmed findings of a previous wetlands reconnaissance for the Lower Site. However, during the delineation investigation, wetlands biologists discovered that some of the wetlands identified along SE Grouse Ridge Road during the reconnaissance visit do not fulfill all the wetland criteria. The delineation investigation confirmed only one wetland (Wetland C) (Figure 7-4) along the SE Grouse Ridge Road, not six wetlands as discussed in the DEIS. Sample plots show non-hydric soils and upland vegetation dominance in five areas incorrectly identified as wetlands. A wetland delineation provides a more detailed analysis than a reconnaissance (Appendix F).

7.1.3.1 Lower Site Wetland

Wetland A near the eastern boundary of the Lower Site was identified during the reconnaissance visit and confirmed during the delineation investigation (Figure 7-5). The wetland is roughly circular and approximately 0.38 acre. Wetland A is a palustrine forested wetland (PFO) dominated by a canopy of red alder, with an understory of salmonberry and youth-on-age as ground cover. Other species include black cottonwood, trailing blackberry, skunk cabbage (*Lysichiton americanus*), and Dewey's sedge (*Carex deweyana*). Subdominant plant species found in the wetland include slough sedge (*Carex obnupta*), sword fern, and lady fern. Vine maple is rooted just outside the wetland border. The surface soil layer extends to 11 inches in depth and is a

black clay loam. The lower layer extends below 18 inches in depth and is an olive-brown sandy loam. The wetland likely receives water from the stream and seep on the Lower Site, both of which infiltrate entirely just north of the wetland boundary.

7.1.3.2 Upper Site Wetlands

No wetlands were found on the Upper Site. However, a number of small springs were found in this area and are described in Chapter 6, Water.

7.1.3.3 Wetlands Along SE Grouse Ridge Road

Wetlands A-1, A-2, B, C-2, and D, which were identified as wetland areas during the reconnaissance visit, were subsequently determined to be upland habitat during the delineation investigation (Appendix F).

The delineation investigation found that only Wetland C exists north of SE Grouse Ridge Road. It is a palustrine forested wetland dominated by deciduous, broad-leaved trees (PFO1) and is less than 0.5 acre in size. This area is identified as a seasonally flooded palustrine scrub-shrub wetland (PSSC) on the National Wetland Inventory map. The wetland encompasses the portion of stream 10 located immediately north of the road, which lies on a berm approximately 10 feet above the wetland surface. Although a 3-foot-diameter culvert permits stream 10 to flow south under the road, the berm appears to obstruct drainage sufficiently to produce semi-permanent inundation and saturation and accumulate a moderate amount of silt.

Wetland vegetation in Wetland C is dominated by red alder in the overstory and salmonberry in the mid-story. Subdominant species present are Sitka spruce, Pacific willow, and Sitka willow (*S. sitchensis*). The herbaceous layer is dominated by reed canarygrass (*Phalaris arundinacea*) and Pacific water *parsley (Oenanthe sarmentosa*). Other species include skunk cabbage, American brooklime (*Veronica americana*), and soft rush (*Juncus effusus*). Other herbaceous plant species include small-fruited *bulrush (Scirpus microcarpus*), tall mannagrass (*Glyceria elata*), youth-on-age, lady fern, giant horsetail, and Dewey's sedge. Understory species include thimbleberry (*Rubus parviflorus*) and trailing blackberry. Coniferous species include Sitka spruce and western hemlock.

The upper soil horizon of Wetland C extends to below 18 inches depth and is a very dark brown loam. Unlike the soil found in the other sample plots taken along SE Grouse Ridge Road, the soil in Wetland C contains high organic content and is subject to prolonged inundation. Due to surface water inputs from stream 10, the soil in this wetland appears to be inundated and/or saturated for most of the year.

Surface water flows slowly through Wetland C in small, braided channels that are not very distinctive. Standing water of various depths also exist. The substrate underlying unvegetated patches where surface water is

permanent or semi-permanent consists of silt and sand. At the time of the delineation investigation, stream 10 was flowing at approximately 4 cubic feet/second (cfs) at the culvert on the south side of the road.

7.1.3.4 Wetland Ratings and Buffers

Wetlands A and C are considered Class 2 wetlands, according to King County Code (KCC) criteria, which is described in the wetland report in the Plants and Animals Technical Report (Appendix F). The wetlands are Class 2 because they are each less than 1 acre in size, possess three vegetation classes, and contain forested wetlands. Class 2 wetlands typically require a 50-foot wide buffer, kept in a natural condition, to protect wetland functions.

7.1.4 Potentially Affected Wildlife Species

The King County Species/Habitat Matrix (King County 1987) provides a good estimate of the species that could be found in the various habitats in and adjacent to the proposed project area (Appendix F). The matrix lists the species likely to be present in a habitat type in King County. The matrix summarizes material gathered during studies in the region over many years and provides a better estimate than would be obtained by a project biologist making daily visits on several occasions throughout the year. King County indicates that the following numbers of species may be encountered in lowland second growth conifer forest and in vegetated urban/suburban settings:

- Amphibians and reptiles: Lowland Conifer–14, Urban Suburban–4
- Birds: Lowland Conifer–46, Urban Suburban–60
- Mammals: Lowland Conifer–26, Urban Suburban–16
- Total Species: Lowland Conifer–86, Urban Suburban–80

These numbers indicate the number of species that will be present in the extensive portion of the proposed project area that would not be an active mine, including buffers, the pre-extraction mine area, and the reclaimed mine area. Many of these species will tolerate or habituate to the disturbances of human activities and persist as long as appropriate habitat is present.

Species detected through visual observations or other signs of presence (such as scat, tracks, beaver dams, or calls) during field studies conducted onsite by URS biologists are discussed below.

Large mammals like Rocky Mountain elk (*Cervus elaphus nelsoni*) and black-tailed deer (*Odocoileus hemionus columbianus*) use habitat within the proposed project area. Elk present on the Upper and Lower Sites may include portions of a herd that reside year round on Grouse Ridge and adjoining lowlands, and portions of a herd that winter in the lowlands and migrate to higher elevation for the summer. Washington Department of Fish and Wildlife staff note that the composition and

movement of the local herd is not sufficiently well known to make definitive statements regarding annual distribution and movement. Population counts during the 1970s estimated the population of Rocky Mountain elk in the nearby Cedar River Watershed at 300 individuals. Present populations of elk in the Cedar and Snoqualmie River Watersheds are unknown. Local residents report observing elk mainly during fall and winter. A few residents report seeing elk during summer. Residents also mentioned that elk in the area forage on landscaping planted by lot owners.

Common mammal predators are coyote (*Canis latrans*), black bear (*Ursus americanus*), cougar (*Felis concolor*), weasels (*Mustela* sp.), mink (*Mustela vison*), and river otters (*Lutra canadensis*). Beaver (*Castor canadensis*) can be found in streams and ponds near the proposed project area. Small mammals include snowshoe hares (*Lepus americanus*), Douglas squirrels (*Tamiasciurus douglasii*), deer mice (*Peromyscus maniculatus*), shrews (*Sorex* sp.), moles (*Scapanus* sp.), voles (*Phenacomys* sp. and *Microtus* sp.), mountain beavers (*Aplodontia rufa*), and other small rodents. Coyotes, Douglas squirrels, a bobcat (*Lynx rufus*), and snowshoe hares were observed at the project sites.

Birds commonly observed at the project site, especially in regenerating forests, included American robins, (*Tundus migratorius*) song sparrows (*Melospiza melodia*), northern flickers (*Colaptes auratus*), spotted towhees (*Pipilo maculatus*), gray jays (*Perisoreus canadensis*), dark-eyed juncos (*Junco hyemalis*), Townsend's solitaires (*Myadestes townsendi*), European starlings (*Sturnus vulgaris*), and rufus hummingbirds (*Selasphorus rufus*). Hairy and downy woodpeckers (*Picoides villosus* and *Picoides pubescens*) were common in medium-aged red alder forests adjacent to the project site. Winter wrens (*Troglodytes troglodytes*) and Bewick's wrens (*Thryomanes bewickii)* were common in brush piles associated with stacking of woody debris in recent clearcuts. Band-tailed pigeons (*Columba fasciata*) were observed near the top of Grouse Ridge near the upper terminus of the proposed conveyor belt. Red-tailed hawks (*Buteo jamaicensis*), turkey vultures (*Cathartes aura*), and American crows (*Corvus brachyrhynchos*) were observed soaring above all habitats at the project site. Pileated woodpeckers were not observed onsite, although some were seen in the vicinity.

Northern alligator lizards (*Elgaria coerulea*) were observed near rock piles on the Lower Site and western toads (*Bufo boreas*) were observed in mixed forest in the vicinity of the Upper Site. Pacific chorus frogs *(Pseudacris regilla*), roughskin newts (*Taricha granulosa*), red-legged frogs (*Rana aurora*), northwestern garter snakes (*Thamnophis ordinoides*), and common garter snakes (*Thamnophis sirtalis*) were observed near ephemeral streams associated with onsite topographical drainages and near streams and beaver ponds draining from the north side of Grouse Ridge.

7.1.5 Potentially Affected Fish

An unnamed tributary of the Middle Fork of the Snoqualmie River fed by perched aquifers on the north side of the Grouse Ridge plateau supports coastal cutthroat trout (*Oncorhynchus clarki clarki*), rainbow trout (*O. mykiss*), and brook trout (*Salvelinus fontinalis*). Hatchery brook trout have been released into the larger beaver ponds on the west fork of the tributary, and the rainbow trout have been released into a private trout pond. Although cutthroat trout are probably native to the stream, according to fish planting information obtained from local residents, hatchery cutthroat may have been released in the larger beaver ponds within the system. Resident coastal cutthroat trout are found in the three main forks of the above-mentioned tributary from Lake Dorothy Road upstream to an elevation of approximately 1,000 feet.

The middle fork of this stream has several small beaver ponds at an elevation of approximately 920 feet that support numerous small (<6 inches) cutthroat trout, with trout present as far upstream as the crossing of a forest road at an elevation of about 1,000 feet. Numerous trees have been recently felled by beavers near these ponds, indicating an active beaver colony.

A small spring feeds an ephemeral stream channel (indicated by a dotted line on Figure 7-3) that runs parallel and approximately 600 feet to the west of the unnamed tributary's middle fork. Water is only present in the ephemeral stream channel in the first 100 feet of the channel below the spring and no fish are present. The unnamed tributary's east fork forks into two smaller tributaries, one on each side of a gravel pit located northwest of the State Patrol Fire Training Center. Cutthroat trout in both of these tributaries are present above the crossing of a forest road to an elevation of approximately 1,100 feet. The trout population in the larger of these tributaries is separated into two sub-populations by an impassable culvert at the road crossing. The middle and east forks of this stream flow around Vallley Camp near Lake Dorothy Road and combine flows shortly before passing through a culvert under Lake Dorothy Road that is an impassible barrier to upstream fish passage.

Below the road, the stream flows for approximately 1,000 feet through a residential area before crossing under a bridge at SE Middle Fork Road and flowing into the Middle Fork of the Snoqualmie River. This stream reach from Lake Dorothy Road to the river supports resident and fluvial coastal cutthroat trout (larger trout from the Middle Fork of the Snoqualmie that spawn in the tributary stream) and rainbow trout (escapees from a privately stocked trout pond). The west fork of this stream passes through a culvert under Lake Dorothy Road and into the stream's main stem.

Three large beaver ponds in a marshy area on the west fork of the stream above Lake Dorothy Road support coastal cutthroat and brook trout. There is good quality spawning gravel in the creek above the ponds. The beaver colony that maintained these ponds has moved out of the area,

and the level of the ponds has dropped approximately 2 to 3 feet below its original level. Western brook lamprey (*Lampetra richardsoni*) and shorthead sculpin (*Cottus confusus*) are also found in this stream.

Another stream flowing directly south of the Washington State Patrol Fire Training Academy supports coastal cutthroat trout and rainbow trout in a 500-foot reach between I-90 and where it flows into the South Fork of the Snoqualmie River. This stream reach contains numerous beaver ponds, and little spawning gravel is available for the few trout observed in these shallow ponds.

Streams crossed by SE Grouse Ridge Road at the crossings of streams 1, 2, 3, 5, 7, 10, and 11 contain populations of coastal cutthroat trout, rainbow trout, and shorthead sculpin. The South Fork of the Snoqualmie River (crossing 1) supports a sports fishery for rainbow and cutthroat trout. The tributaries at crossings 2, 3, 5, 7, 10, and 11 have good quality gravel and provide important spawning areas for fluvial populations of trout in the river.

7.1.6 Potentially Affected Threatened and Endangered Species

Information concerning threatened and endangered species and habitats was received from the U.S. Fish and Wildlife Service (USFWS), Washington State Department of Fish and Wildlife (WDFW), and the Washington Natural Heritage Program (WNHP) (Appendix F). The following species were identified to potentially occur in or near the proposed project site.

7.1.6.1 Federally Listed Species

- Northern spotted owl (*Strix occidentalis caurina*)
- Marbled murrelet (*Brachyramphus marmoratus*)
- Bull trout (*Salvelinus confluentus*) Coastal-Puget Sound Distinct Population Segment (DPS)

7.1.6.2 Federal Species of Concern

- California wolverine (*Gulo gulo luteus*)
- Pacific fisher (*Martes pennati pacifica*)
- Long-eared myotis (*Myotis evotis*)
- Long-legged myotis (*Myotis volans*)
- Pacific Townsend's big-eared bat (*Corynorhinus townsendii townsendii*)
- Northern goshawk (*Accipiter gentilis*)
- Olive-sided flycatcher (*Contopus cooperi*)
- Cascade frog (*Rana cascadae*)

- Tailed frog (*Ascaphus truei*)
- Pacific lamprey (*Lampetra tridentata*)
- River lamprey (*Lampetra ayresi*)

The species listed above have not been documented or surveyed within the proposed project area. Bull trout are present throughout the Snoqualmie River system below Snoqualmie Falls. Bull trout have not been documented above Snoqualmie Falls, and it is unlikely that they occur in the vicinity of the proposed project areas. Additional discussion about bull trout is in Appendix F. Potential habitat does exist onsite for several other of the species listed above, as discussed below.

Suitable foraging and nesting habitat does occur at the proposed project site for the olive-sided flycatcher. Although the olive-sided flycatcher is a federal Species of Concern and rare in many parts of the country, it is relatively common in the Pacific Northwest. The bats (long-eared myotis, long-legged myotis, and Pacific Townsend's big-eared bat) have not been documented near the proposed project area. Suitable foraging habitat for these species may exist on the site, although the lack of caves or other suitable roosting sites is likely to discourage resident populations.

The Washington State Department of Natural Resources (WDNR) implemented a Habitat Conservation Plan (HCP) for its commercial forest land within the range of the northern spotted owl. The HCP designates lands east of the proposed project area as nesting-roosting-foraging (NRF) habitat for the northern spotted owl. Within designated NRF areas, the management objectives are to maintain or restore spotted owl habitat for these activities. Forest management activities are severely constrained and forest harvest may be eliminated.

Land adjacent to SE Grouse Ridge Road is primarily WDNR land and is designated as NRF habitat from Exit 38 to approximately 1,500 feet from the State Patrol Fire Training Center. Dominant vegetation cover types include mixed deciduous and coniferous forest, deciduous forest, and recent clearcut harvested areas (Figures 7-1a and 7-1d). No spotted owl nests are known in the area because the current forest patches are not suitable habitat.

The USFWS lists no plant species as Threatened, Endangered, or a Species of Concern within or near the project area. The WNHP also has no record of any occurrence of rare plants within a mile of the Upper and Lower Sites or SE Grouse Ridge Road. The sites are heavily disturbed by previous logging and mining activity and are therefore not appropriate habitat for the Endangered, Threatened, and Sensitive vascular plants listed as occurring in King County by WDNR.

7.2 Environmental Impacts

Impacts to plants and animals during construction and operation of the gravel mine would be similar and are therefore analyzed jointly in this

section. Impacts would be habitat loss or alteration and disturbance to wildlife species. Habitat loss or alteration would occur during initial construction and during each mining phase throughout the 25 years of activity. Disturbance to wildlife would be due to activities occurring during construction of the processing facilities and roads and during mining operations.

7.2.1 Construction and Operation Impacts

Construction and operation of the proposed project would result in some loss of wildlife habitat. The 318 acres of the peripheral portion of the 578-acre Upper Site would be retained as a buffer. The proposed buffer area includes the small portion of mature forest found in the southwest corner of the Upper Site that would be maintained as high-value wildlife habitat. Of the 260 acres proposed for mining and facilities, at any one time only about 50 acres would be in active mining.

7.2.1.1 Alternative 1–No Action

Under Alternative 1, the proposed project area would continue to be operated as commercial forest on a rotation cycle, with 25 to 60 years between complete harvest. Plants and animals would be affected by commercial timber harvesting, but it's not possible to quantify such impacts without specific proposals.

7.2.1.2 Alternative 2–Proposal: Lower and Upper Sites Mining - Exit 34

Wildlife and Terrestrial Resources

Construction and operation under Alternative 2 would primarily result in temporary loss of wildlife habitat associated with the forest lands in various stages of harvest and regeneration. Wildlife would be displaced from areas in active mining and in areas used for site facilities. When wildlife is displaced, it usually moves to adjacent suitable habitat. However, if adjacent or nearby habitats are at carrying capacity for a particular species, then the arrival of displaced wildlife may cause stress in the affected populations, resulting in a temporary decrease in productivity, health, and an increase in mortality for the displaced populations. If Rocky Mountain elk using the Lower Site as winter range were to be displaced to similar low elevation habitat in adjacent areas, they may use residential areas for foraging.

The olive-sided flycatcher, a federal species of concern, would not be able to use active mining areas as foraging and nesting habitat until site restoration of each area reaches an appropriate seral (ecological community) stage. The habitat that would be lost is neither unique nor rare, and flycatchers would be able to use nearby habitat until restored habitat matures enough to provide food and cover. Therefore, no impacts on olive-sided flycatchers would occur. No other endangered,

threatened, or sensitive plant or animal species or species of concern occur in the Proposal site area.

Several resident and migratory species would be disturbed by construction and operation activity. Most birds and mammals would be displaced into adjacent habitats. Habitat for smaller animals, such as amphibians and reptiles, would be removed during pre-mining clearing. If clearing activities take place during the breeding season, nests and dens at these locations would be destroyed.

Volunteer weedy plants would also become established in the restored areas. The restored areas would not have the diversity of plants found in existing clearcuts and it may take longer for a robust seedling/shrub community to develop following mining.

Mining noises could discourage wildlife species, particularly breeding species, from using portions of the project sites. In general, however, most species would habituate to mining activity and continue to use the habitat areas adjacent to mining activity. Animals are generally tolerant of regular steady noise such as would be produced by the steady operation of mining machinery. Noise levels in adjacent areas due to mining operations would not exceed the Washington State Department of Ecology's Environmental Designation for Noise Abatement (EDNA) levels, which are well below noise levels known to affect animals during laboratory studies (see Chapter 5, Noise). However, some areas would experience increases of more than 10 dBA, which is considered significant under EPA guidelines. Mitigation of noise impacts is discussed in Chapter 5, Noise.

Construction of the conveyor and maintenance road would result in the clearing of approximately 7.3 acres between the Upper and Lower Sites under a worst-case scenario. The conveyor maintenance road would pass under the conveyor in two locations, and an existing forest road would pass under the conveyor in one location, providing access for deer and elk. The conveyor belt connecting the Lower Site to the Upper Site may constitute a barrier to movement of deer and elk around the west end of Grouse Ridge. While smaller animals would be able to cross under the conveyor belt, deer and elk may not find sufficient clearance.

Aquatic and Riparian Resources

Excavation during operations at the Upper Site may modify discharge from perched aquifers feeding the middle and east forks of the unnamed tributary of the Middle Fork of the Snoqualmie River and the stream flowing directly south of the Fire Training Academy into the South Fork of the Snoqualmie River. This could slightly increase spring flows and reduce flows in summer and fall, primarily affecting the streams above their fish-bearing reaches. Flow from these aquifers contributes only a small portion of the total flow in the stream reaches that support fish. Total flow from the springs ranged from 0.1 to 0.3 cfs for streams that flow north and for springs that flow into the south-flowing streams.

Measurements of stream flow in reaches that support fish showed no correlation with changes in spring flows from perched aquifers.

Changes in spring flows fed by perched aquifers are unlikely to have significant impacts on stream volumes, fish and amphibian populations, aquatic macroinvertebrates, or beaver colonies in lower reaches of these streams. Cascade and tailed frogs may occur along streams draining the north and south sides of the Grouse Ridge plateau. The slight changes in stream-flow patterns that may occur if perched headwater aquifers are disturbed during mining operations would not significantly affect these frogs, except in the 50- to 100-foot perennial reaches that flow immediately below springs fed by the headwater aquifers. The headwater springs fed by perched aquifers on the north side of Grouse ridge feed small intermittent channels flowing under logging slash and do not provide habitat for amphibian larvae below the short perennial reaches immediately below the springs. The slight changes in flow timing that may occur during mining operations would not impact riparian vegetation along these streams. The discharge of headwater springs would be monitored during the mining operation to avoid the dewatering of headwater riparian habitat.

Wetlands

The wetland and streams on the Lower Site would not be affected by the proposed project; the applicant has removed the freshwater storage pond from the proposal. Wetland A, near the eastern boundary of the Lower Site, is outside of proposed project area.

7.2.1.3 Alternative 2A–Upper Site Mining and Limited Lower Site Mining - Exit 34

The impacts for Alternative 2A would be similar to those outlined for Alternative 2 above. However, gravel would be extracted from an area approximately 7.5 acres smaller than under Alternative 2, so the impacts to wildlife habitat would be less.

7.2.1.4 Alternative 3–Lower and Upper Sites Mining - Exits 34 and 38

Wildlife and Terrestrial Resources

Impacts under Alternative 3 would differ somewhat from those discussed for Alternative 2. Operational noise at the Upper Site would be greater, thus increasing the potential disturbance of wildlife species at the Upper Site. Alternative 3 would lack the proposed conveyor belt, resulting in a 7.3-acre decrease in disturbed habitat when compared to Alternative 2. The absence of the conveyor would also eliminate this potential barrier to elk or deer migration. Approximately 1.8 miles of SE Grouse Ridge Road would have to be widened to allow truck traffic to travel in both directions.

While northern spotted owls do not nest in the forests adjacent to SE Grouse Ridge Road, under its HCP, WDNR manages the area as spotted owl NRF habitat. A high level of truck traffic may discourage use of the habitat by this owl species. Assuming that displacement would extend approximately 600 feet upslope of the road, approximately 131 acres of potential spotted owl habitat would be lost during the 25 years the Upper Site is in operation. The forests adjacent to the road are currently marginally suitable NRF habitat. In the absence of tree harvest activities, full use of the habitat area would return in time.

Aquatic and Riparian Resources

Under Alternative 3, impacts on streams and riparian areas adjacent to the proposed project site would not be expected to differ significantly from those discussed for Alternative 2. However, SE Grouse Ridge Road would need to be widened to meet King County road standards to permit truck traffic travel in both directions. If the road is widened, instream work would occur at the crossings of streams 2 through 11, 13, and the portions of streams 9a and 10a flowing through roadside ditches. Six of the streams and the streams flowing through ditches are ephemeral; construction would occur during the low flow period when the channels are dry.

Depending on the extent of road widening required, several areas of upland wildlife habitat and areas of riparian, wetland, and in-stream habitat may be filled and culverts extended, leading to a small net loss of habitat. Potential impacts from road construction include sediment release into stream channels, filling of wetlands, and loss of potential large woody debris recruitment. Seven of the streams (including the South Fork of the Snoqualmie River) contain fish populations. Because the road is paved, it is unlikely that truck traffic would release any significant amount of fine sediment into the streams or wetlands.

The 400 feet of additional roadway to access the Upper Site and 1,800 feet of bypass road which may be built for this alternative would also require instream work if the roadway crosses small tributary streams. Any channel crossed would be ephemeral and likely be dry during the construction season, thereby reducing the potential for sediment release into fish-bearing stream reaches downstream from road construction. All applicable best management practices (BMPs), standards, and guidelines would be followed during road construction. It is unlikely that any significant release of sediment into stream channels would occur.

Wetlands

Wetland impacts under Alternative 3 would be the same as under Alternative 2 for the Lower Site. The widening of SE Grouse Ridge Road could avoid impacts to Wetland C on the north side of the road through design of the road and required construction BMPs.

7.2.1.5 Alternative 3A–Upper Site Mining and Limited Lower Site Mining - Exits 34 and 38

The impacts from Alternative 3A would be similar to those outlined for Alternative 3. However, gravel would be extracted from an area approximately 7.5 acres smaller than Alternative 3, so less wildlife habitat may be eliminated.

7.2.1.6 Alternative 4–Upper Site Mining - Exit 38

Wildlife and Terrestrial Resources

Impacts under Alternative 4 would be similar to those from Alternative 3. These impacts include the loss of habitat at the proposed project site and along the new or widened roadway, displacement of wildlife, and impacts of operation noise on wildlife. Because the Lower Site would not be developed, Alternative 4 would disturb only the 231 acres at the Upper Site, thus reducing the direct loss of wildlife habitat to 50 acres at any given time. Elk that use the Lower Site for winter range would not be displaced and not be affected by this alternative. None of the habitat is unique, so impacts from the temporary loss of habitat would be expected to be low.

Aquatic and Riparian Resources

Alternative 4 impacts would be similar to those under Alternatives 2 and 3.

Wetlands

Impacts to the wetland adjacent to SE Grouse Ridge Road from Alternative 4 would be similar to those from Alternative 3. Mining operations would not occur at the Lower Site.

7.2.2 Cumulative Impacts

Disturbance to perched headwater aquifers at the Upper Site may alter flows of two streams. These changes to flow timing are expected to be insignificant, and the stream flows are only a small contribution to total flows related to fish-bearing reaches. Cumulative impacts to total stream flow, fish and amphibian populations, aquatic macroinvertebrates, or beaver colonies would be minimal.

Widening SE Grouse Ridge Road to accommodate truck traffic in both directions would require instream work at 12 tributaries and 2 roadside ditches that are classified as ephemeral streams (9a and 10a) of the South Fork of the Snoqualmie River. The channels of seven of these tributaries would likely be dry during construction. These tributaries empty into a 1-mile reach of the river. Road widening would not remove enough canopy cover to increase water temperatures or reduce the

recruitment of large woody debris in the South Fork of the Snoqualmie River significantly, but a potential for cumulative impacts on the river from multiple sources of sediment discharge does exist. It is unlikely that significant impacts to aquatic resources (fish, macroinvertebrates, and amphibians) in the South Fork of the Snoqualmie River and its tributaries would occur from road construction because the area of stream channel expected to be disturbed is small and all applicable BMP standards and guidelines, including compliance with the King County Surface Water Design Manual, would be followed during construction.

Petroleum products dripping from vehicles, tire wear, and material falling off vehicles have the potential to degrade water quality. Storm runoff may carry these products to the tributaries of the South Fork of the Snoqualmie River. In addition, paving increases the runoff rate, thereby increasing erosion potential. Maintenance operations can contribute sediment and chemical contaminants to stormwater runoff. Compliance with water quality requirements of the Surface Water Design manual would reduce impacts resulting from increased use of the road. Therefore, impacts to water quality and fisheries/aquatic resources from increased traffic on SE Grouse Ridge Road would be expected to be insignificant.

Due to concerns for water quality, fisheries, and wildlife (especially endangered species), management of large areas of both public and private forest lands is changing. Federal lands in the Mount Baker–Snoqualmie National Forest are now managed in conformance to the Northwest Forest Plan. This plan substantially alters the level of timber harvest, protects riparian areas and much of the forest in the central Cascades, and alters management practices, largely eliminating even-age management and clearcut harvests. Under the Endangered Species Act (ESA), forest management plans have been developed that provide for the protection of threatened and endangered species. Such plans, termed Habitat Conservation Plans (HCP), are currently being implemented for Plum Creek's Central Cascade forest lands, the City of Seattle's Cedar River Watershed and WDNR forest lands. Additionally, King County and state park and wildlife lands are being managed to become near natural forest lands.

The valley bottom lands around the cities of North Bend and Snoqualmie are rapidly becoming urbanized, and rural residential lands are developing on their perimeters. Nevertheless, the preponderance of lands within the region (within 10 miles of the proposed project) are now covered under management plans designed to address environmental concerns. The federal lands to the north and to the east are now covered by the Northwest Forest Plan. The Mount Si area is managed by WDNR as a natural resources conservation area. To the south, the headwaters of the Cedar River are covered by the City of Seattle's HCP. Some of the private forest lands along the I-90 corridor are covered by Plum Creek's HCP. To the west, Rattlesnake Ridge is protected as open space, and in the lowlands to the northwest, the County's Three Forks Park protects riparian lands at the conjunction of the North, Middle, and South Forks

of the Snoqualmie River. Therefore, because the adjacent lands are being managed for protection of biological resources and habitat, the proposed project should not have significant cumulative impacts on plants and animals.

7.3 Mitigation Measures

7.3.1 Alternative 1–No Action

If Weyerhaeuser continues to manage the Lower and Upper Sites as timberlands (with the existing gravel quarry on the Lower Site), these activities would follow standards and guidelines in the Forest Practice Act as administered by WDNR.

7.3.2 Alternatives 2, 3, and 4 (Including Limited Lower Site Mining)

The following components of the proposed Action Alternatives would limit the impacts to plants and animal: Major portions of the Upper and Lower Sites would be in buffers and remain in a natural state throughout the project life. In phased strips, the mine area would be cleared of vegetation, mined, and restored to commercial forest vegetation. The mining cycle would take approximately 5 years from clearing to restoration. Prior to replanting, topsoil and large woody debris would be restored to the mined areas. Topsoil would provide organic matter, some native plants, and soil flora. Restored areas would be replanted with erosion-sediment control seed mixes and subsequently planted with Douglas fir seedlings during the following winter.

From the perspectives of both wildlife management and forest production, active management of the buffer lands and the restored mine lands under Alternatives 2, 3, and 4 would improve conditions more quickly than would planting and no management activities. Fertilizing, precommercial thinning, commercial thinning, and other forest practices are recommended to improve the health and vigor of the forest and concurrently improve wildlife habitat.

7.3.2.1 Buffer, Forest, and Reclamation Areas

The proposed mining plan should provide for effective protection of project site land not being mined through the use of fencing, road configuration, signage, and other measures. Land not in the mining phase should be protected from casual use by the mining operation or the public (i.e., should not be used for stockpiling mined material or as casual haul routes) and should not be used as recreation areas for off-road vehicles. The mining plan should also protect the existing timber stands that provide high value wildlife habitat.

7.3.2.2 Recover and Stockpile Topsoils and Woody Debris

Topsoil should be salvaged at each mine segment before mining begins. After mining is complete, the saved topsoil should be spread over the area/segment. The living organisms that facilitate the decomposition of raw materials and assist in the uptake of minerals and nutrients for living plant species require air and water and do not survive prolonged burial at depth. The continual restoration of completed mine segments should allow "living topsoil," inclusive of organic debris, to be replaced in the shortest period of time. During reclamation and restoration, at least five pieces of large woody debris (>10 inches in diameter and more than 15 feet long or the root wad of a similar-sized tree) should be placed per acre. Screening berms and mined area should be top-dressed with topsoil prior to planting. Based on an assessment by a forester, soil scientist, or other trained restoration specialist, soil amendments may be required prior to planting. In addition, forage areas for deer and elk should be planted to minimize conflicts with neighboring land uses.

7.3.2.3 Revegetation Plans

Revegetation seed mixes in the proposed project's reclamation plan should include a broad pallet of plant species that provide benefits to wildlife. WDFW should be consulted regarding appropriate seed mixes. The King County Noxious Weed Control Program should be consulted regarding the management of noxious weeds during the revegetation portion of the reclamation process. Some forest areas should be planted with a mix of conifer species in addition to Douglas fir. Screening buffers, stream and wetland buffers, forested wetlands, and other areas should include plantings of western red cedar, Sitka spruce, silver fir, grand fir, and other appropriate species so that pocket stands of diverse forest can develop over time.

7.3.2.4 Bird Nests

In order to minimize the loss of bird nests, eggs, or juveniles, clearing should not occur during the nesting season from April 1 through June 30.

7.3.2.5 Wetlands

Wetland impacts associated with the proposed project should be mitigated by applying the commonly accepted mitigation sequence detailed in the Wetland Delineation Report in the Plants and Animals Technical Report (Appendix F). The sequence is as follows: avoidance, minimization, rectification, and compensation. Because the wetland located in the Lower Site (Wetland A) is a non-isolated wetland according to KCC 21A.06.1410 and impact avoidance is apparently feasible, direct impacts to Wetland A and its buffer from building construction or landscape modification would not be permitted by King County. If

complete avoidance of the wetland is determined not feasible, then wetland impacts should be minimized as much as possible by mitigation. The King County Sensitive Areas Ordinance (SAO) requires that the amount of wetland impacted after minimization be replaced using compensatory mitigation.

7.3.3 Alternatives 3 and 4 (Including Limited Lower Site Mining)

Mitigation measures for Alternatives 3 and 4 would be the same as those for Alternative 2. In addition, road construction and widening on SE Grouse Ridge Road should follow all applicable BMPs and standards and guidelines at stream crossings to avoid, minimize, or eliminate impacts to the aquatic environment due to the release of sediment into streams. Methods used should include the following measures:

- Effective sediment barriers should be constructed at approaches to stream channels.
- Construction should occur during periods of low flow before adult trout return to their spawning beds and after the emergence of trout fry from the gravel.
- The construction corridor through streams and riparian areas should be kept as narrow as possible.
- Disturbance to stream banks, existing channels, and riparian areas should be minimized.
- Machine activity in streambeds should be kept to an absolute minimum.
- Culverts at crossings of fish-bearing streams that present a barrier to fish passage should be replaced with culvert designs that allow fish passage to habitat above and below the road.
- Streambanks should be stabilized and re-vegetated after construction is completed. Riparian and aquatic habitats should be restored to their preconstruction condition within on or two growing seasons (or longer for forested and shrub-dominated areas).
- Riparian trees removed during construction should be placed in the stream channel with their root wads intact to provide instream habitat for fish and control sediment transport.
- Increases in base-line turbidity should be monitored during construction and construction should be stopped if turbidity levels exceed a percentage of the base-line levels agreed to with the relevant federal, state, and local agencies.

7.3.3.1 Wetlands

Widening SE Grouse Ridge Road, if necessary, should be done in a manner to prevent encroachment to Wetland C, located just north of the road. This wetland is adjacent to the road shoulder for approximately 50

linear feet. The existing road width of the section adjacent to Wetland C appears sufficient for truck travel. Widening should be limited to the south side of the road. Because it appears feasible to construct the road without filling the wetland, impacts to the wetland would not be allowed pursuant to KCC 21A.24 and therefore could not be permitted by King County. If complete avoidance of the wetland is determined not feasible, then wetland impacts should be minimized as much as possible through mitigation. The King County SAO requires that the amount of wetland impacted be replaced using compensatory mitigation.

7.4 Significant Unavoidable Adverse Impacts

7.4.1 Alternative 1–No Action

No significant unavoidable adverse impacts would occur under Alternative 1.

7.4.2 Alternative 2–Proposal: Lower and Upper Sites Mining (Including Limited Lower Site Mining)

Under Alternative 2, the temporary loss of approximately 300 acres of wildlife habitat at the Lower and Upper Sites would occur. Habitat at the Lower and Upper Sites is composed primarily of coniferous forests in the early seral stages of regeneration. This habitat is not rare or unique and a temporary loss of this habitat would not be considered a significant adverse impact. Impacts to wildlife habitat would be mitigated by reclaiming each 50-acre segment of the mining operation upon completion of gravel extraction and returning the segments to their pre-mining use of timber production, thus avoiding a significant adverse impact to wildlife habitat. No more than 90 acres (50-acre segment on the Upper Site and the 40-acre Lower Site) would be lost as wildlife habitat at any time.

Because it appears feasible to avoid the wetlands, impacts to wetlands would not be allowed pursuant to KCC 21A.24 and therefore could not be permitted by King County. All impacts on wetlands that cannot be avoided or minimized must be compensated in accordance with the King County SAO.

7.4.3 Alternative 3–Lower and Upper Sites Mining (Including Limited Lower Site Mining)

Impacts from Alternative 3 would be the same as those identified for Alternative 2. In addition, if in-stream work is required during widening of SE Grouse Ridge Road, all applicable BMPs and standards and guidelines would be followed to avoid, minimize, or eliminate significant adverse impacts. Depending on the extent of road widening required,

several acres of upland wildlife habitat and less than 2,000 feet of riparian and in-stream habitat would be filled and culverts would be extended, leading to a small net loss of streambed habitat. This small area of permanently impacted habitat would not be considered a significant adverse impact.

By expanding the road away from the wetland, impacts to the wetland could be avoided. All impacts to wetlands that cannot be avoided or minimized must be compensated according to the King County Sensitive Areas Ordinance SAO.

7.4.4 Alternative 4–Upper Site Mining - Exit 38

Impacts under Alternative 4 would be the same as those described for Alternative 3 but apply to the Upper Site only.